

SF Phosphates Limited Company

M/047/007

Scenic View of Vernal and the Ashley Valley



This panoramic view of Vernal, and the Ashley Valley includes many scenic and historical locations.

Red Fleet was named such because from certain locations, the three rocky projections look like three battleships in high seas. Split Mountain Gorge is a rugged canyon cut through the mountain by waters of the Green River.

The upheaval and formation of the Uinta Mountains and millions of years of erosion make a unique area to visit.

Phosphate is one of three most important elements for plant growth and is essential to all forms of life. This mineral was formed millions of years ago in a shallow marine environment. It was not until a little over 100 years ago, however, that its beneficial uses were discovered.

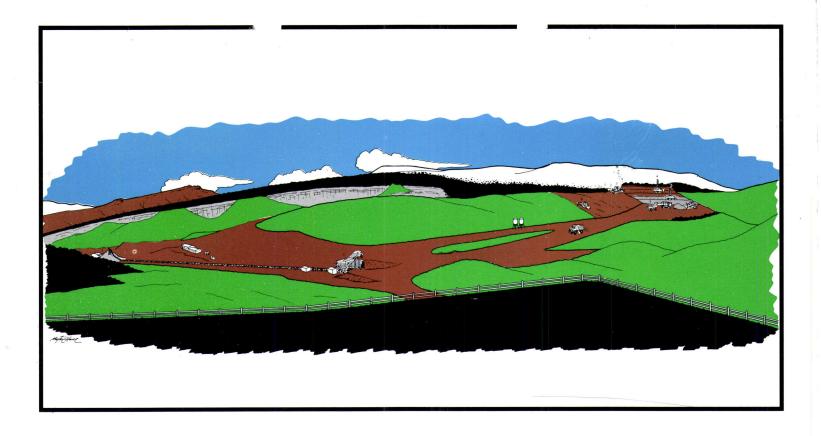
Stauffer Chemical constructed the original plant in 1960, and mining operations began in 1961. The mine was purchased in 1981 by Chevron Resources Company, and within a short time a large expansion program was started. In 1984 Chevron began construction on the fertilizer plant in Rock Springs, Wyoming, and a 96-mile pipeline was built for transporting phosphate slurry to the fertilizer plant. By 1986 the pipeline and fertilizer plant were operational.

In April, 1992, the mine, pipeline, and fertilizer plant were purchased by J. R. Simplot Company, Boise, Idaho, and Farmland Industries, Inc., Kansas City, Missouri. SF Phosphates Limited Company was formed through this joint venture.

J. R. SIMPLOT COMPANY is a privately held agribusiness company. Their mission statement is BRINGING EARTH'S RESOURCES TO LIFE. "Through prudent use of soil, minerals, and water, we produce food and other products for the nourishment and enrichment of mankind."

FARMLAND INDUSTRIES, INC., an agricultural food marketing and manufacturing cooperative head-quartered in Kansas City, Mo., is the largest farmer-owned cooperative association in the United States. Farmland serves the needs of agricultural producers in America's heartland, and consumers throughout the world.

The Vernal mine and mill are capable of producing about 1.3 million tons of phosphate concentrate per vear.



Mining Phosphate

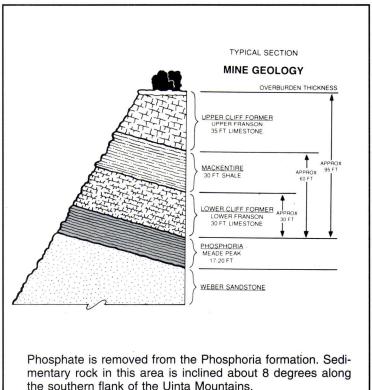
Mining is accomplished through a sequence of distinct tasks or steps. Reclamation is an integral part of the mining process and begins with the initial step of topsoil conservation. Topsoil is carefully removed with D-11 bulldozers (1). Topsoil is either placed immediately on previously mined and recontoured areas, (2) or is stockpiled (3) for future use. Stockpiled topsoil is reseeded to prevent erosion and nutrient deterioration. Juniper trees and other vegetation are retained with the soil to provide mulch when the soil is replaced.

Beneath the 4-8 inch layer of topsoil is a 30-45 foot layer of carbonate and shale. This layer, called overburden, is of insufficient mineralogic value and is removed to expose the ore. A 21 by 21 foot pattern of 9inch diameter holes is drilled in the overburden (4). Holes are loaded with explosives and the pattern is blasted to break up the rock. Fragmented and loosened rock material is then moved with D-11 dozers to an adjacent mined out area, and the ore layer is thus exposed.

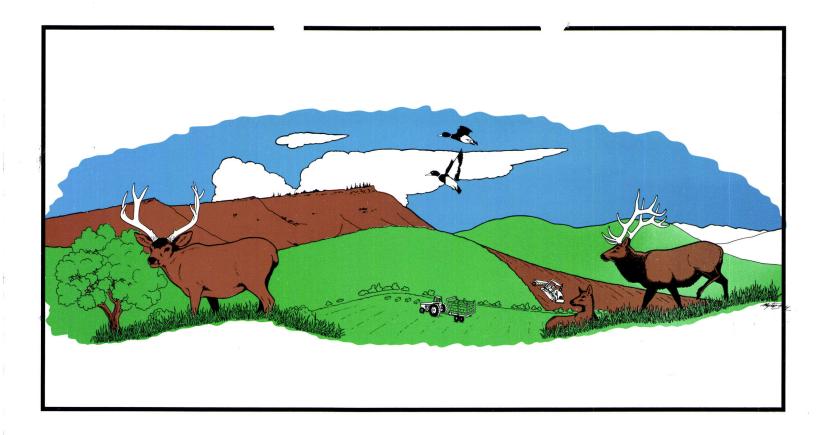
The ore layer is 17 to 20 feet thick and is visually distinguished from overburden by its dark gray color. An 11 by 11 foot pattern of 5.5 inch diameter holes is drilled through the ore. The holes are filled with explosives and blasted. Broken-up ore is then loaded into 85-ton trucks with a 13yard (27-ton) shovel (5). The haul trucks transport the ore to a portable crusher attached to an overland conveyor (6). The crusher reduces particle size of the ore to less than 10 inches in diameter. Crushed ore is conveyed to an 110,000-ton stockpile above the Semi-Autogenous Grinding Mill (7).

Mined areas are backfilled with overburden and

recontoured with dozers to a stable and natural surface configuration. Topsoil is uniformly spread over recontoured surfaces with a D-4 dozer. In late fall and early spring, when weather conditions are optimal, seed is applied using a rangeland seed drill (8). Revegetated areas in view are distinguished by the increased ground cover and lack of Juniper trees.



the southern flank of the Uinta Mountains.



Reclamation and Wildlife

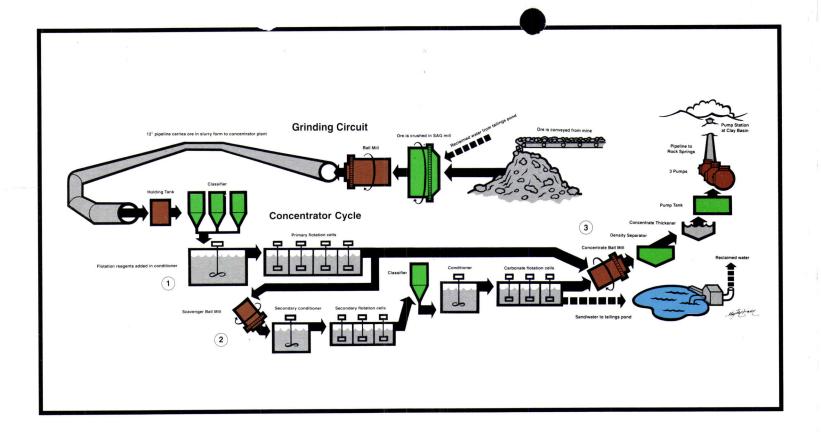
SF Phosphates is dedicated to preserving and enhancing the environment. All lands are reclaimed as soon after mining as practical. Reclamation involves recontouring of overburden material; reapplication of conserved topsoil; and revegetation. The goal of reclamation at SF Phosphates is to restore the environment, enhance wild-life usage, and minimize erosion.

The seed mix used to revegetate mined lands is scientifically designed to provide forage for big game. Alfalfa and other nitrogen-fixing legumes are mixed with certain grasses and shrub species, all of which are palatable and healthy for elk and deer. Native Pinyon-Juniper habitat diminishes soil quality by excessive extraction of nitrogen and moisture. As a result, the mining and reclamation process replaces very low forage capacity areas with highly productive grassland.

Ducks, geese, and other migratory water fowl also thrive on mine property. The 365-acre tailings pond provides year-round aquatic habitat and is clean and pure enough to support trout inhabitance.

Pro-environmental actions at the mine clearly benefit many forms of wildlife. Approximately 7000 acres of mine property serve essentially as a wildlife refuge. This area is fenced and is closed to public access. Elk and deer herds may also be fed during harsh winter months with hay farmed in fields near the mine entrance.

SF Phosphates is proud of the environmental heritage that has created this wildlife haven and is committed to continuing this tradition.



Ore Concentrating

Ore from the mine is crushed to less than 10 inches and conveyed to an ore storage pile above the SAG (Semi Autogenous Grinding) mill. The ore can then be funneled through a chute and into the grinding process as it is needed.

Within the SAG Mill building, ore is mixed with water and ground to particles less than 1 millimeter in diameter. The SAG mill itself, as well as the smaller conventional ball mill, are used to grind the ore.

Ground ore is pumped as a slurry through a 12" plastic pipe to the main concentrator building. In this building a series of processes is used to extract useful portions of the rock. Ore slurry is first mixed with reagents and floated to recover the most pure phosphate mineral fraction (1). The material rejected from the initial flotation is directed through a secondary or scavenger crushing, flotation, and carbonate flotation circuit (2) to remove unwanted material. The concentrate from the secondary process is mixed with the phosphate from the initial separation and sent into the Concentrate Ball Mill (3) for final grind. The concentration

process increases phosphate content from 17-20% in unprocessed ore to around 31% in finished slurry. Unwanted material is separated at various intermediate stages and directed to the tails impoundment facility.

Concentrated phosphate rock slurry is sent through a density separator and concentrate thickener to remove excess water. Slurry can then be pipelined 96 miles to a processing plant in Rock Springs, Wyoming. Three 2000-HP pumps at the Vernal pump station and three identical pumps at a pump station near the midpoint (48 miles) are required to deliver the material to Rock Springs.

Once in Rock Springs, phosphate rock is processed with sulfuric acid, then mixed with ammonia and other chemicals to create fertilizer. Fertilizer product is distributed throughout the West and Midwest for use in agricultural applications. Although the only product made in Rock Springs is fertilizer, phosphate can also be used in a variety of other applications including soft drinks, pickling, pharmaceuticals, denture cements, textiles, lithography, jellies, and sugars.